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The tectonic, climatic cycles and the geological disasters on the Chinese Loess Plateau

Li Tonglu


Chang'an University, China


Japan
October. 2012

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The main topics

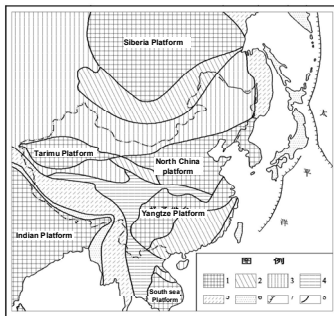
1. The tectonic cycles
2. The paleo-climate changes
3. The periods of geodisaster activation
4. The geodisaster at present
5. The social problems
6. Conclusions

 **长安大学** The records of tectonic cycles



Angular unconformity: Folding-depression-uplifting
A cycle remained in orogenic zone

 **长安大学** The tectonic cycles around China




Precambrian events


- 1--Platform
- Fuping movement (Late Ar)
- Luliang movement (E-M Pt)
- Jingning (M-L Pt)

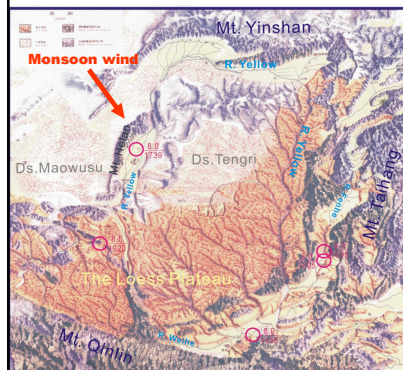
- 2--Caledonian (e-S)
- 3--Hercynian (D-P)

- 4--Yanshan (J-E)
- 5--Indo-Sinian (T-J)
- 6--Himalayan/Alps (N-Q)

 **长安大学** The Terrain of China



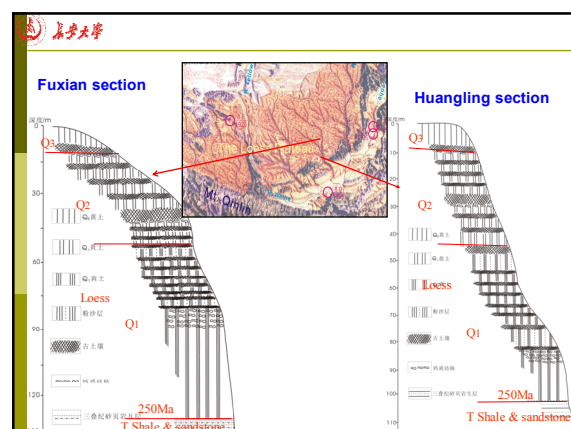
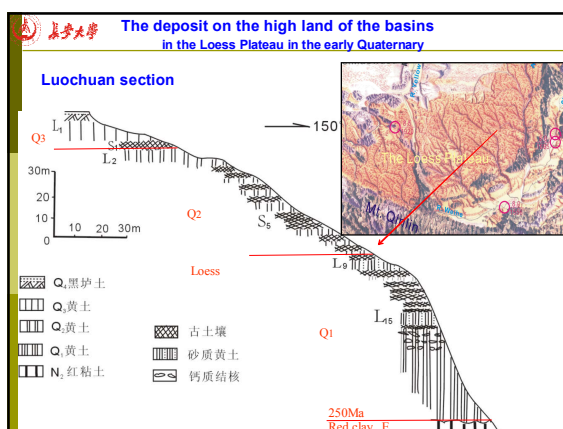
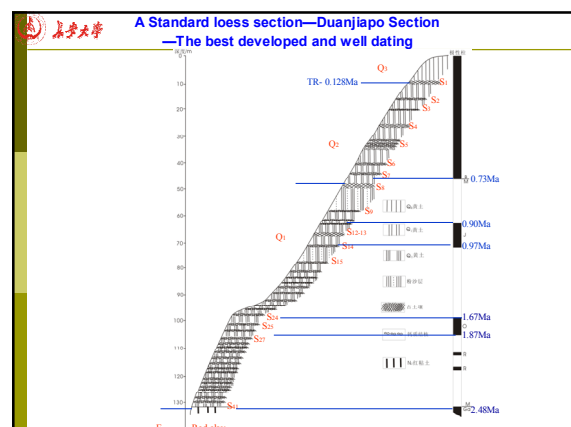
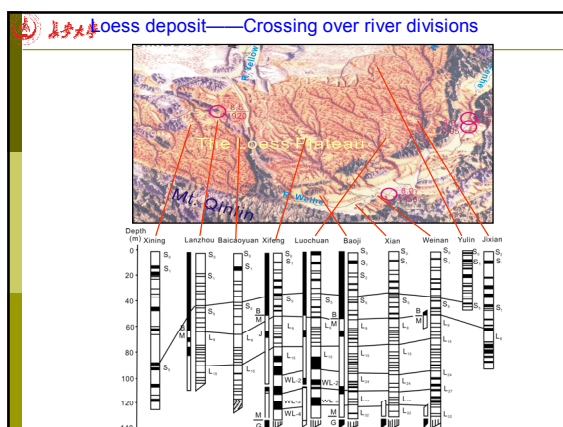
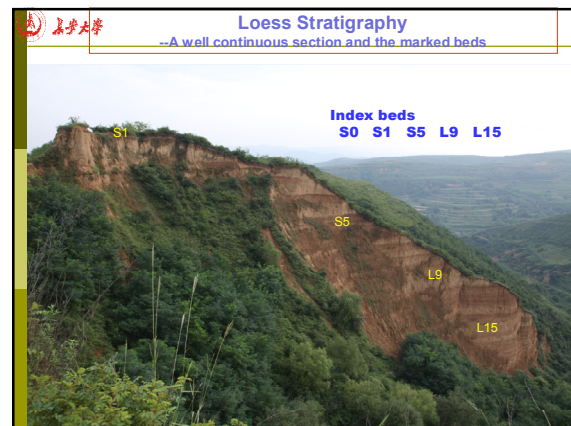
 **长安大学** The Chinese Loess Plateau

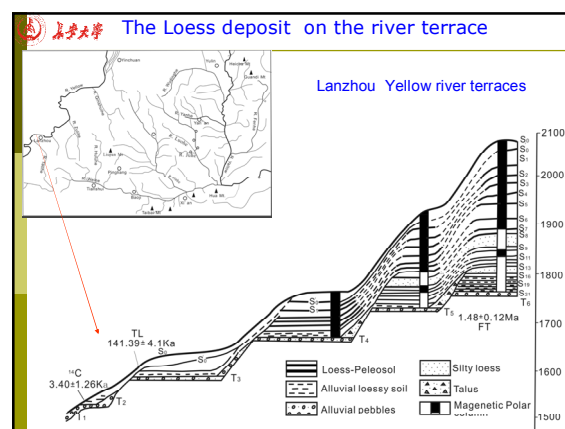
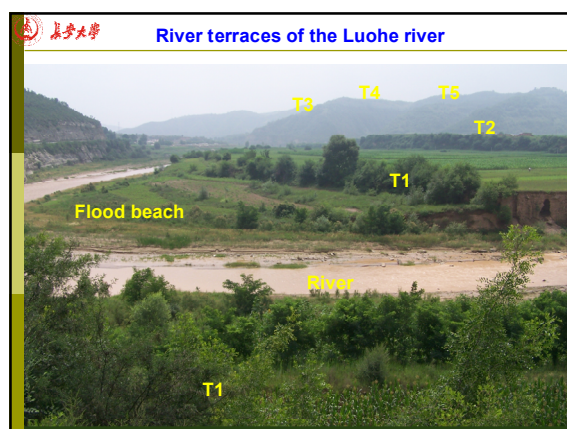
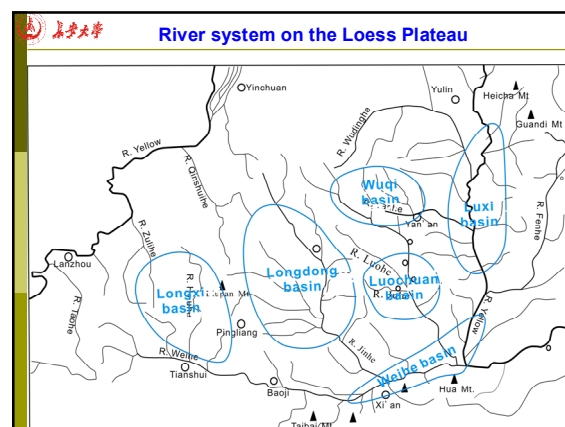
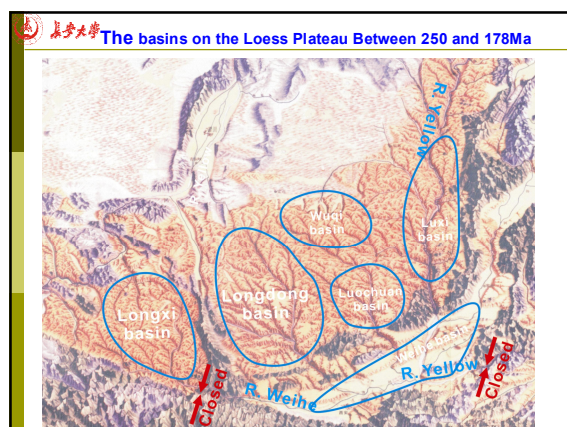
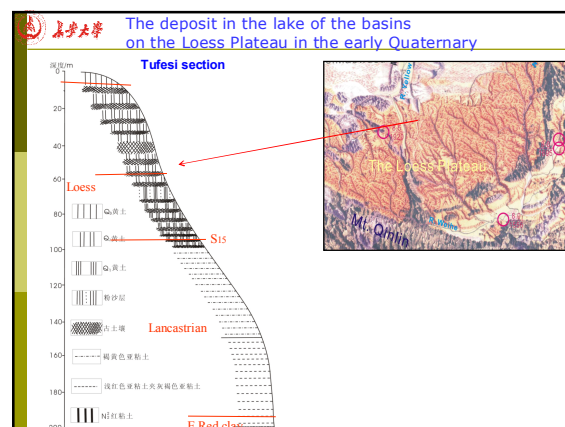
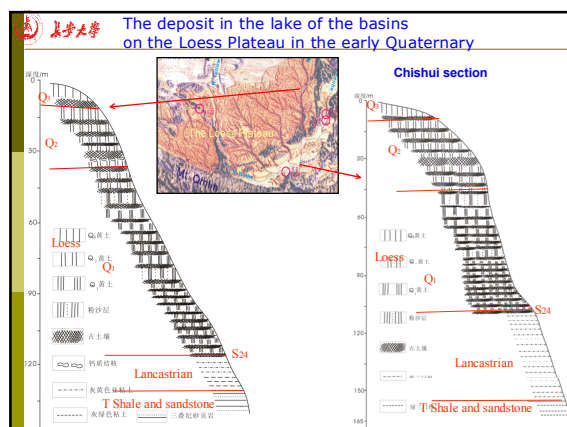


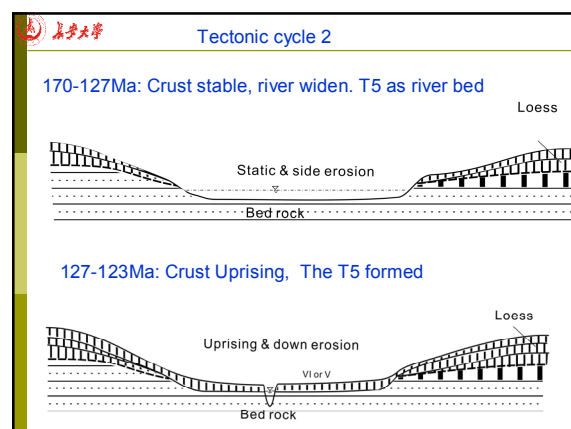
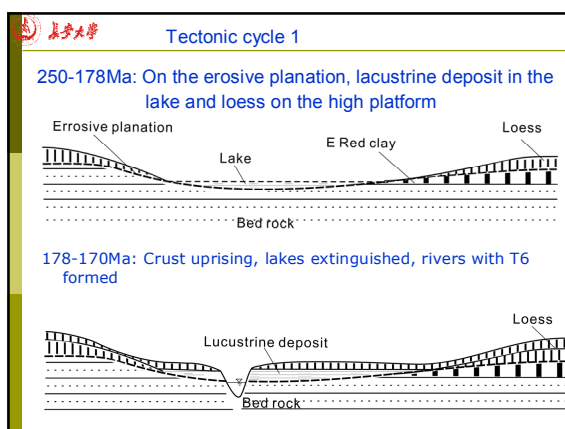
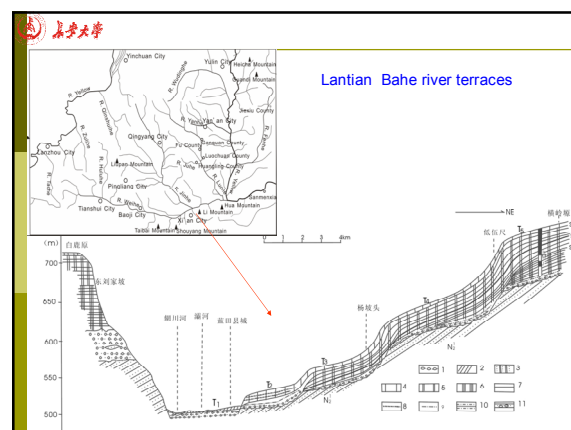
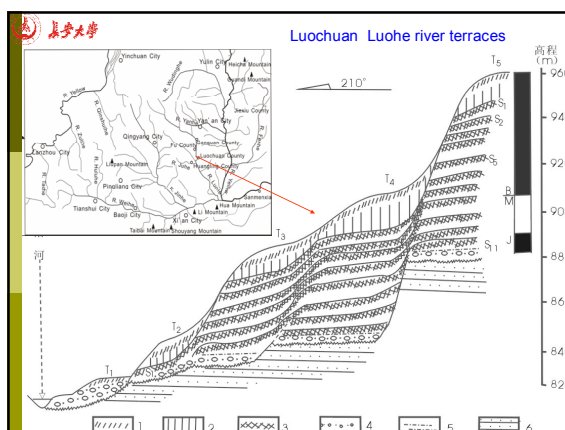
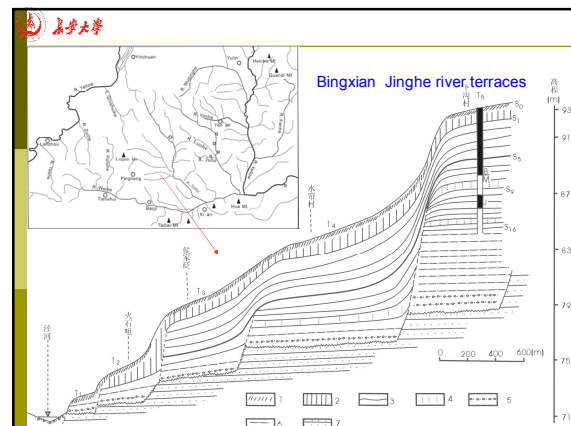
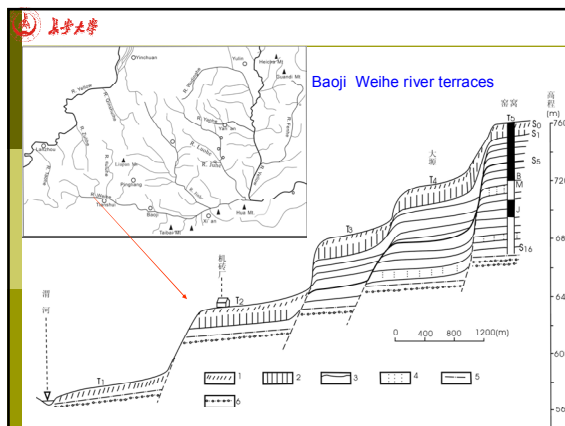
Loess deposits above the water level by windblown.

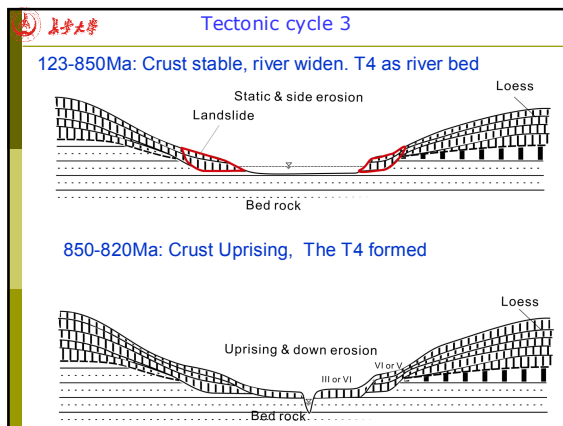
The loess plateau is within the North China Platform.

The Neotectonic movement is intermittent uprising, which was recorded stratigraphically & geographically.



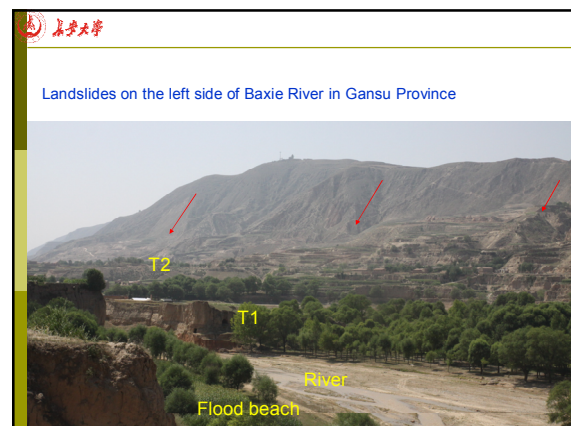
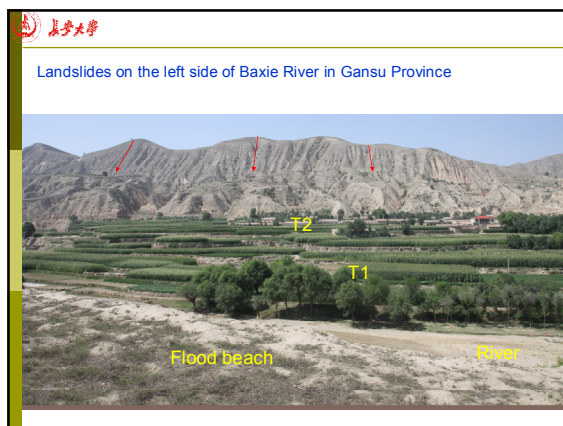
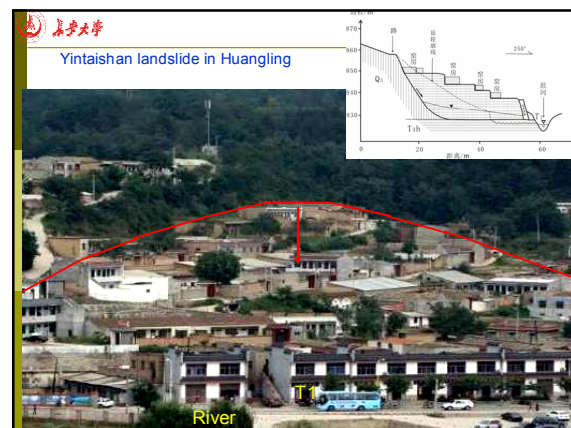
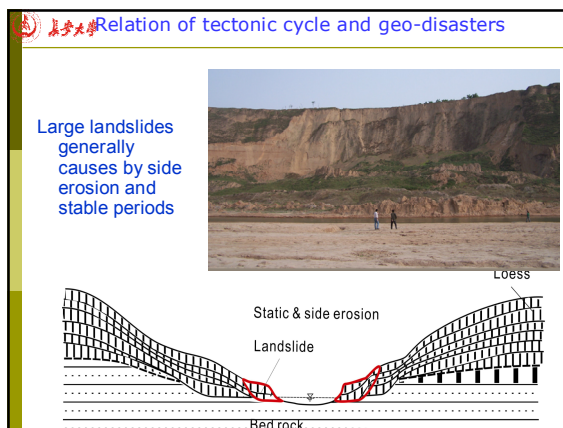


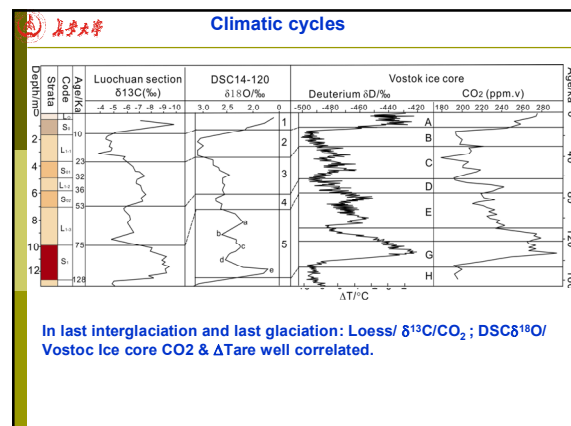
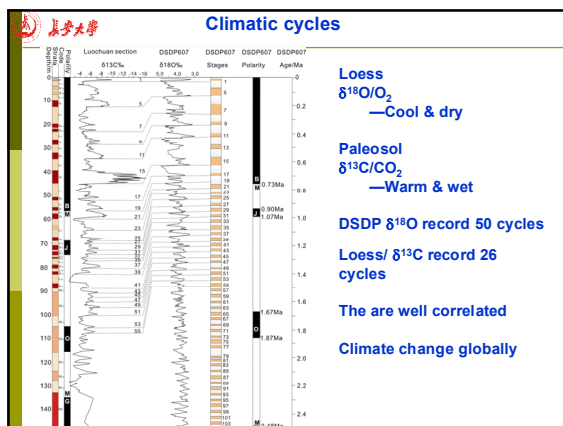
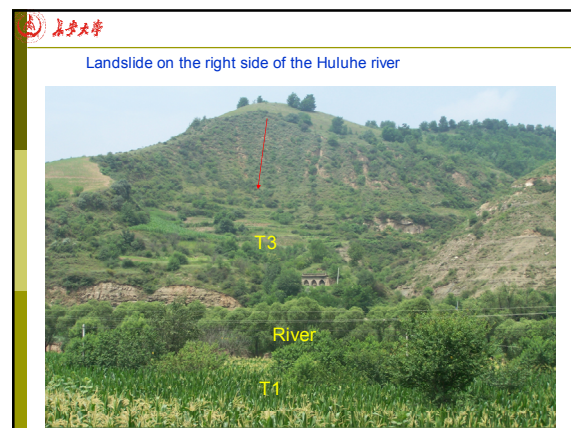
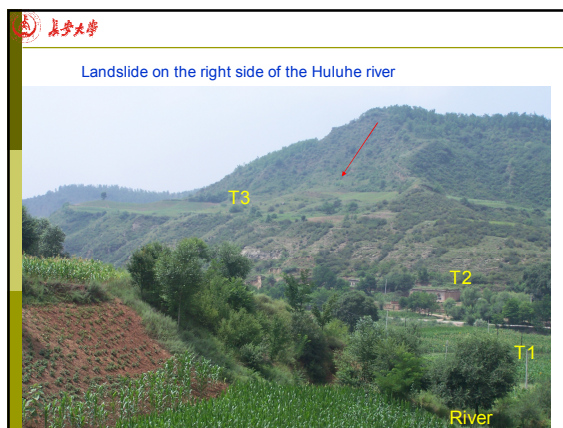
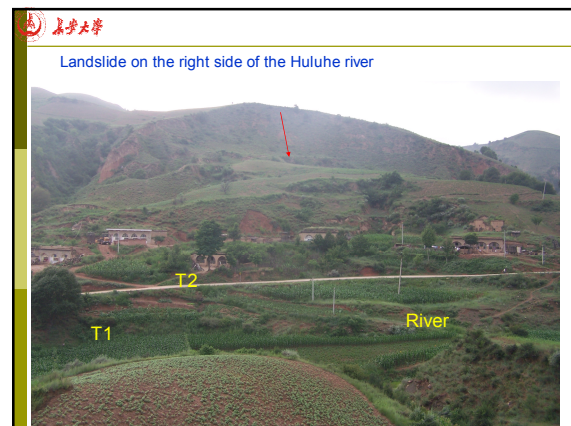




Tectonic cycles and erosion periods

Tectonic	Time /X10 ⁴ a	Tectonic Movement	Terraces & Erosion	Loess on terraces
	250.0		Plantation	Weathering
Cycle 1	178.0-250.0	Static	Basins with lakes	S23-S16
	170.0-178.0	Uprising	Lakes outflow, rivers formed	S21-S15
Cycle 2	170.0-178.0	Uprising	Lakes outflow, rivers formed	S21-S15
	123.0-127.0	Uprising	Down cutting, T5 rising	L10
Cycle 3	85.0-123.0	Static	Side erosion, T4 widen	S8-S9
	82.0-85.0	Uprising	Down cutting, T4 rising	L7
Cycle 4	66.0-82.0	Static	Side erosion, T3 widen	S3-S6
	62.0-66.0	Uprising	Down cutting, T3 rising	L2
Cycle 5	17.0-62.0	Static	Side erosion, T2 widen	S1-S2
	12.0-17.0	Uprising	Down cutting, T2 rising	L1
Cycle 6	2.3-12.0	Static	Side erosion, T1 widen	S0
	1.0-2.3	Uprising	Down cutting, T1 rising	L0
Cycle 7	0.4-1.0	Static	Side erosion, Flood beach	Ms
	0-0.4	Uprising	Down cutting, Present river bed	







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Tectonically & climatically, present is not prefer for the geodisaster activation

Rivers were limited to a narrow and shallow valley.



Modern loess reflect a relative dry and cool climate.

The present geological disasters are mainly caused by human activities

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Modern erosion generally caused small collapse

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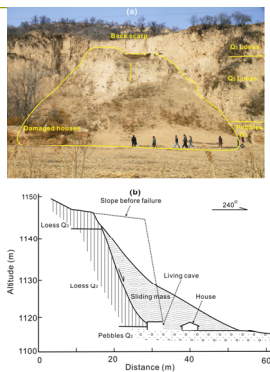
▣ Landslide caused by slope cutting




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Living caves caused landslides





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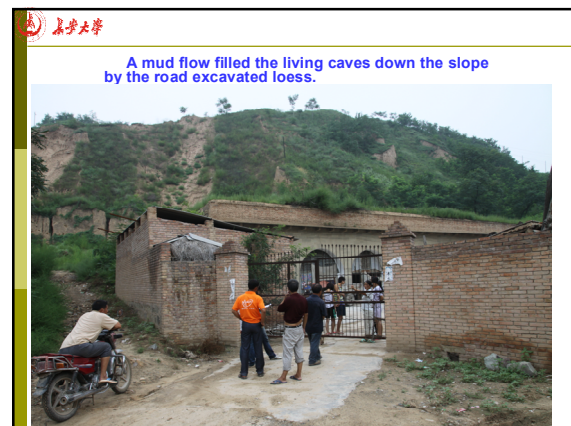
The houses in danger



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A potential slide may cause by the wasted living caves in loess.





Conclusions

Disasters are socially built, they are the products of a misconception of development processes in developing countries.

As Sergio Mora point out: " Around two thirds of the total damage could have been spared by using space (land, territory) more wisely, taking better care of the environment, and by offering more options to the chronic impoverishment of our populations.

So disaster risk management is more essential than technical mitigation.

***Thank you
for your attention!***